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OPHTHALMOLOGY

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# RELAPSING TRAUMATIC BULLOUS KERATITIS, WITH CASES.

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OF PHILADELPHIA.

Paper read before the Ophthalmic Section of the College of Physicians of Philadelphia, Oct. 15, 1901.

At longer or shorter periods after the apparent healing of trivial corneal abrasions, the affected eye may become the seat of irritative phenomena quite out of proportion to the original injury. These phenomena may appear in the form of

1. Relapsing bullous (or vesicular) keratitis, originally described by Hansen Grut[1] in 1872.

2. Recurring erosions of the cornea, first recorded by Von Arlt[2] in 1875

3. Recidivating traumatic keratalgia,[3] a name given to the affection in 1888 by Grandclément[4], who believed that it had not previously been described.

These manifestations represent analogous if not identical lesions. In general terms the symptoms are the following: Some time, several weeks or several months, after an abrasion of the cornea by a finger nail, a twig, or similar object, the patient experiences, almost always on awakening in the morning, some difficulty in opening the eye, followed, when the lid is raised, by marked foreign-body-sensation, decided epiphora, flushing of the eyeball and sharp neuralgic pain. Each movement of the lid is painful, and the "attack" continues from one-half to several hours, when, usually by afternoon, the symptoms subside and the eye is again apparently normal. These attacks may recur at short or long intervals, for weeks, months and even years. Careful examination during the continuance of the irritative signs just described will reveal on the cornea a small ruptured vesicle, or a larger blister or bulla, or sometimes simply an erosion of the superficial epithelium without indications of vesicle or bulla. Occasionally the only lesion to be detected is the scar or macula caused by the original injury, without loss of epithelium.

During the last three years several important communications

[1] Hospital-tidende, 1872, No. 51, and Congrés International, Copenhague, 1884, quoted by Jensen, Archives d'Ophtalmologie, 18, 1898, p. 229.

[2] Ueber die Verletzungen des Auges, Wien, 1875.

[3] This affection has also been called finger nail keratitis and cicatrix dolorosa.

[4] Progres médical, Mai 12, 1888, and Semaine médicale, May 6, 1888.

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have appeared upon this subject, in which the literature is fully reviewed, by Jensen[1], von Schroeder[2], Praun[3], and Stood[4], and this need not, therefore, be further discussed. All these authors refer to the meagre accounts of this troublesome affection which appear only in a few text-books, most of which pass it by in silence, and to its somewhat infrequent occurrence.

Stood has met with the condition 60 times among 40,000 patients, and Jensen 37 times among 50,000 patients examined during eleven years. I have not examined the records of my public services for statistical information on this point, but among nearly 12,000 private patients I have encountered three cases with present certain features that seem to render their brief record worthy in this connection.

*Case* 1. *Recurring erosion of the cornea preceded by vesicle formation, the result of a slight abrasion.*—On the 25th of September, 1888, a married woman, aged about thirty, came with the following history: One month before the date named she began to experience at intervals attacks of inflammation of the left eye, which lasted for a few hours, then disappeared, only to recur again and again. Some weeks prior to her first corneal attack, on August 30th, the affected eye had been switched by a horse's tail. No attention had been paid to this slight accident, and its effects had apparently entirely passed away and the incident had been forgotten until the ocular discomforts just described began. On examination a small almost exactly central superficial abrasion was visible, with a slight ciliary injection at the outer side.

The treatment consisted of atropine drops, boric acid solution and yellow oxide salve, but after a number of recurrences during the following two months, always preceded by the formation of a small vesicle at the area of original injury described, which broke down and was followed by irritative phenomena and sharp neuralgic pain, these mild measures were discontinued and the spot was touched with the actual cautery. For a time the cure seemed complete; when one month later a small bleb appeared, and the erosion with the usual symptoms followed. The treatment from now on consisted

[1] Archives d'Ophtalmologie, 18, 1898, p. 229.

[2] Mittheilungen aus der St. Petersburger Augen-Heilanstalt, Heft V, 1898 p. 26.

[3] Die Verletzungen des Auges, Wiesbaden, 1899, p. 167.

[4] Archiv. f. Augenheilkunde, Bd. XLIII, Heft 4, 1901, p. 220.

of the internal administration of arsenic and frequent massage, first with calomel ointment and later with yellow oxide salve. The attacks became less frequent, but continued until the following June, when after two severe explosions of neuralgia the blebs stopped forming and the eye become permanently quiet. The duration of the whole process was about eight months. A very slight corneal scar remained, but in spite of this, after the correction of the astigmatism, vision became normal in each eye.

This eye never gave the patient the slightest trouble until twelve years later, when an erosion appeard, without apparent cause, just on the edge of the slight macule which remained from the primary injury, which lasted nearly six weeks. Cure was finally secured by three thorough applications of the tincture of iodine.

*Case 2. Recurring erosions of the cornea the probable result of a finger-nail scratch; no preceding vesicle formation detected.*—A married woman, aged twenty-eight, came for consultation on the 13th of September, 1899, with the following history: For six months prior to her visit, at intervals of never less than a month, always in the early morning, the left eye had suffered with intense pain, which had always been diagnosticated as ciliary neuralgia, and which had been attributed to eye-strain. The eye became red and watery, but after the attack had passed away, which it did in a few hours, the eyeball and lids assumed an entirely normal appearance. The woman was in indifferent health and had been subjected to much worry. She was nursing an infant, and although it was not positively determined, it is practically certain that some time prior to her first attack of keratalgia the sharp nail of the baby's finger had scratched her eye.

When examined, the vision of each eye was normal after the correction of three quarters of a dioptre of hypermetropic astigmatism. The ophthalmoscopic examination revealed no abnormalities, nor was the slightest alteration detected at that time on the corneal surface. Three days after her first visit an "attack" occurred and she came at once to the office. A drop of fluorescine was instilled and a small erosion, looking like an irregular scratch, was visible in the upper portion of the cornea. During one month the patient was under observation and suffered three typical attacks. The erosion was always easily detected by means of the fluorescine test, but a vesicle was never discovered.

The treatment consisted of the ordinary antiseptic lotions, and one application of a 2 per cent solution of nitrate of silver and several applications of a 2 per cent solution of holocain to the abrasion. The patient then left the city, and as her husband was a doctor he was given a solution of holocain with instructions how to use it. Six weeks later he wrote, stating that no attack had occurred until that date, when there was a typical reappearance of the keratalgia with the erosion, which was at once relieved by the holocain. Since then no word has come from this patient, but I feel sure that had there been a recurrence of the attacks notification would have been forwarded. During the six months prior to her visit to my office all manner of treatment had been prescribed for what was supposed to be a ciliary neuralgia, but no one seems to have suspected the true nature of the case.

*Case 3. Relapsing bullous keratitis, probably of traumatic origin.*—A man, aged thirty-five, came for consultation on the 29th of July, 1901, and gave the following history: He had always been myopic and for years had believed his left eye to be so myopic and so poor sighted that the right one was used exclusively. He was wearing the following correction:

O. D. $-8 \underset{c}{\bigcirc} + 1.50$ axis 180, $\frac{6}{12}$.

O. S. $-12 \underset{c}{\bigcirc} -1.$ axis 180, $\frac{6}{40}$.

The patient's general health was perfectly good, his business was that of a merchant tailor, and he was actively employed as a bookkeeper in his own establishment. Ophthalmoscopic examination revealed the usual appearances in high myopia, that is, posterior staphyloma and rarefaction of the choroid. There was a good deal of mottling of this membrane in the macular region of the left eye, with some spots and small masses of pigment heaping.

For six weeks or more prior to his visit he had on numerous occasions, always early in the morning, awakened with a feeling as if there was a cinder in the right eye and as if the lids were glued to the ball so that he opened them with difficulty, and with what he described as a "filmy feeling," and with a certain amount of neuralgic pain in the supra- and infra-orbital region.

All manner of treatment had been utilized for his relief,—antiseptic lotions, astringent applications to the lid, internal remedies

and even epilation of the lashes with the belief that some of these might have been incurved and caused the irritation. The doctor in attendance wrote me that he finally made up his mind that he was dealing with a neurosis of some character.

Suspecting the nature of the case, a most careful examination was made of the cornea without finding any positive lesion except a minute grayish spot just above the upper pupil border of the right eye, such a spot as one often sees after a cinder has been removed from the eye. The patient, however, was not sure that he had sustained any injury, although of course he was equally not sure that he had not at some time or other prior to his attacks of irritation and neuralgia, had an imbedded foreign body in the cornea.

The patient's refraction was fully corrected, with the following result:

$$\text{O. D.} - 7 \underset{c}{\bigcirc} - 2.75 \text{ axis } 75, \tfrac{6}{10}.$$

$$\text{O. S.} - 15 \underset{c}{\bigcirc} - 2.25 \text{ axis } 165, \tfrac{6}{12}.$$

This glass was ordered, and after it had been worn for about a week he could easily read $\frac{6}{9}$ with the right eye and $\frac{6}{9}$ partially with the left. During this time he took small doses of the biniodide of mercury.

Ten days later he appeared in my office with the statement that he had had two slight attacks of his foreign body sensation, one on that morning. The cornea was carefully examined and a minute black speck found in the neighborhood of the previously named small grayish infiltration. This was removed and the patient dismissed. At the end of six days the patient again reported that he had awakened on that morning with by far the sharpest attack that he had yet experienced of his corneal irritation and ciliary neuralgia. The eye was injected, but not more than it had been on any previous examination; a moderate amount of conjunctival catarrh was always present. At the point of slight infiltration previously mentioned there was a little grayish haze, and careful examination showed that the entire center of the cornea was occupied with a large bleb which had not yet broken and which looked exactly like a water blister, in other words, there was a typical bulla of the cornea.

The nature of the case was now clear, the bleb was punctured, the collapsed walls removed, the eye sterilized as carefully as possible, bandaged, and the next day, as there was some increase in the infil-

tration at the upper edge of the lesion, the patient was admitted to a private room in the hospital.

The treatment consisted of the instillation of scopolamine, frequent irrigations with boric acid solution and the internal administration first of salicylate of sodium and later of quinine and arsenic. In forty-eight hours the epithelium of the denuded area was renewed, with the exception of a small sickle-shaped area above, which was slightly grooved and the edges of which were infiltrated and which stained deeply with fluorescine. This ulcer was curetted and touched three times with iodine. Healing was uneventful, and the patient left the hospital on the 30th of the month, and since that date to the present time has had absolutely no return of his discomforts. When his vision was last tested, a month ago, it was $\frac{6}{12}$ in the right eye and $\frac{6}{9}$ in the left, and the slight corneal macula was yielding to massage with the yellow oxide of mercury.

During his stay in the hospital, that is, from the 18th of August until the 30th of the same month, the patient experienced a number of neuralgic attacks but slightly accompanied with the foreign-body sensation. These attacks, of which there were eight, almost invariably began at three o'clock in the morning, lasted for about fifteen or twenty minutes, and recurred again between five and six of the same morning, that is to say, when the patient was awakened. The pain was always in one of three situations, directly in the supraorbital notch, in the forehead above the notch, or in the infraorbital region. A few of the attacks occurred early in the evening, that is, between 9 and 9:45, and on these occasions the second attack appeared later in the morning, that is, from 7:30 to 7:45. The attacks were always speedily controlled by hot compresses and the administration of caffein and antefebrin. During the time of the neuralgia there was a slight febrile manifestation, at night the temperature usually being between 99 and 100, once rising almost to 101, while in the morning it touched the normal line. Malaria was excluded.

It will be seen that these cases typify the three manifestations of this affection which I have briefly outlined, namely, traumatic bullous keratitis with many relapses; typical relapsing erosion, preceded by vesicle formation; and characteristic relapsing erosion without demonstrable vesicle formation, the vesicle in all probability having disappeared on each occasion before the patient presented herself for examination.

It is not necessary to dwell upon the somewhat obscure nature

of these cases and how readily they may be mistaken for some other affection. As to the treatment, it has not differed from that which has been recommended by all authors who have written upon this subject, namely, some form of cauterization of the erosion, massage with the yellow oxide of mercury and during the proper stage an occlusive bandage, except in one particular, namely, the apparent value of holocain in one case. Certainly it would seem to be a useful drug to alleviate the irritation, and if what we know of its value in other forms of corneal ulceration is remembered, a useful application, as it proved in my case, directly to the affected area. One of the cases demonstrates, as Jensen points out, that although the cornea usually clears up entirely, it may become infected and a corneal ulcer develop. Indeed, on a few occasions, the infection has been sufficiently great to produce iritis and hypopyon.

With regard to the pathology of this affection, as Praun states, Fuchs makes the plausible explanation that the epithelium over the original spot of injury is not regenerated in a normal manner, so that if the occasion arises it can be readily lifted up from its position, probably in the form of a bleb or vesicle, which collapses, and when the patient is examined the erosion alone is visible.

Stood, who has gone into the matter with a great deal of care, comes to the conclusion that a theory advanced by Grandclement and others that the pain depends upon a neuritis of the finest nerve endings in the corneal epithelium, associated with trophic disturbances, is not correct. He wishes to find the explanation of these phenomena in the anatomical condition of the deepest cylindrical epithelial layer, which is attached by minute tooth-like processes in the furrows of the fibrilla of the anterior elastic lamina, and by this means has an intimate relationship with this tissue. Owing to the injury a certain extent of the epithelium is torn away from its attachments and the anterior portion of Bowman's membrane is probably bruised, so that the new-formed epithelial cells which spring forward at the borders of the defect are unable to form the normal attachment to the underlying tissues. During the night the conjunctiva of the closed lid comes in contact with this epithelium, and when the lid is opened the poorly detached epithelium is torn away and the fine nerve endings are broken. Following this a transudation from the parenchyma of the cornea finds its way through the pores of the lamina elestica which represent the nerve canals, and this produces the bleb-like formation.